

A JURASSIC NEUROPTERAN FROM THE LITHOGRAPHIC LIMESTONE OF BAVARIA.<sup>1</sup>

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In the Hagen collection of fossil insects at the Museum of Comparative Zoölogy there are a number of Neuropteroides from the lithographic limestone of Solenhofen, Bavaria. Most of these insects were adequately described by Hagen in his several papers on the neuropteroid fauna of this formation, but some of them were dismissed with only a few words or were not described at all, so that their exact affinities have been uncertain. Among these incompletely described fossils there is one which is especially striking, because of its excellent preservation and its affinities with certain recent genera. Since Mesozoic Neuroptera are very rare, it seems advisable to describe this fossil with the completeness it deserves.

The insect is a true Neuropteran (Planipennia) and is the specimen to which Hagen applied the name *Nymphes fossilis* in his *Neuropteren aus dem lithographischen Schiefer in Bayern* (1862). Except for the mere statement that the fossil was an excellent one, no description or figure was given, so that Hagen's name for the insect has no standing. Handlirsch did not examine this specimen during the preparation of his comprehensive account of fossil insects, and was obliged to ignore it. The other Neuroptera of the lithographic limestone have been treated by several authors in general accounts of the Solenhofen insects. Eighteen recognizable species have been described, although it is probable that some of these are synonymous. Handlirsch's division of the species into families is largely artificial and unsatisfactory, but a dependable classification can be made

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only after a study of the type specimens. It is quite obvious, however, that insects related to the recent *Hemerobiidae* and *Myrmeliontidae* are present, as well as others more remote from these families. One of the genera, *Nymphites* Hasse (1890,) seems to be closely related to the recent Australian genus *Nymphes*, as observed by Hasse. The Jurassic genus differs from *Nymphes* by the possession of a branched media in the fore wing and a much smaller number of cross-veins. A second genus, *Sialium* Westwood (1854), was based upon a species apparently somewhat similar to *Nymphites*, but the type specimen is so poorly preserved that its exact affinities cannot be determined.<sup>1</sup> Hagen's "Nymphes fossilis", although undoubtedly belonging to a new genus, is so closely related to *Nymphites* that I can see no reason to exclude it from the family *Nymphitidae*.

Family *Nymphitidae*.

**Mesonymphes**, new genus.

Allied to *Nymphes* and *Nymphites*. Wings slender, pointed, with a number of cross-veins in the costal space and in the subcostal area, between R1 and Sc. Sc close to R1; R1 bent downward distally; Rs with 13 branches in the fore wing, and 11 in the hind wing; media joined to the stem of the radius a little basad of the origin of Rs; M branched in the fore wing, the branches diverging close to the base of the wing; M unbranched in the hind wing; Cul without a basal branch; Cu2 a well-developed vein, sending a large series of short terminal branches to the hind margin of the wing; 3 anal veins in the fore wing. The hind wing has a narrower costal space, a smaller anal area, and is somewhat shorter than the fore wing. Cross-veins much less numerous than in *Nymphes*.

Genotype: *Mesonymphes hageni*, n. sp.

(Figure 1.)

Length of fore wing (estimated), 4.0 cm.; hind wing, 3.6 cm. Width of fore wing, 1.0 cm.; hind wing, .9 cm. Anterior

<sup>1</sup> Scudder even placed it within the Blattidae (Mem. Bost. Soc. N. H. 3:472, 1886).

margin of wing straight or nearly so, posterior margin regularly convex, the wing being broadest at about the middle; the costal space is much broader distally, so that the termination of R1 is very remote from the apex of the wing; area between Sc and R1 with 4 or 5 cross-veins; R1 distinctly curved backward at its distal end; Rs and M diverging from R close together; space between R1 and Rs with less than 10 cross-veins; between the basal branches

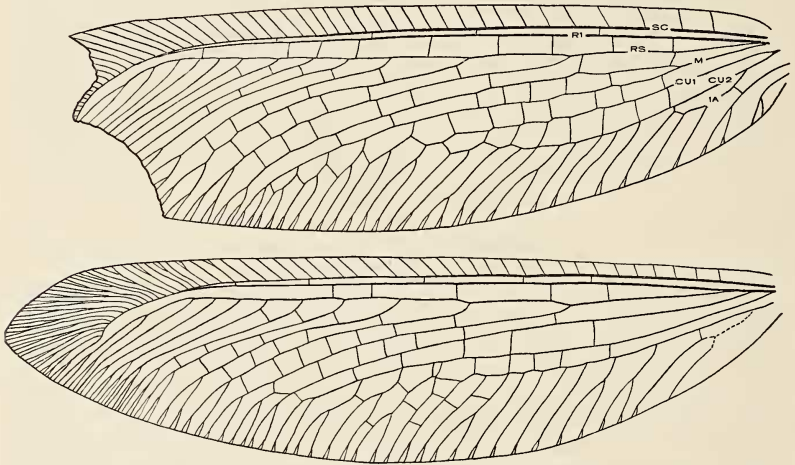


Fig. 1 Venation of fore end hind wings of *Mesonymphe hageni*, n. sp. Sc, subcosta; R1, radius proper; Rs, radial sector; M, media; Cu1 and Cu2, branches of cubitus; 1A, first anal.

of Rs there are numerous cross-veins, but there are apparently none at all between the distal branches; Cu1 long and straight, with seven irregular distal branches; Cu2 is much more strongly developed, with eleven branches; 1A forked in both wings; cross-veins present between Cu1 and Cu2. The specimen has the left fore and hind wings well apart; the right wings are folded together, so that the veins are indistinguishable. The body is slender, being 30 mm. long, and 3 mm. wide; no details of the head are preserved.

Holotype: no. 1999 Museum of Comparative Zoölogy. On the back of this specimen, in German script and in Hagen's

characteristic writing: "Nymphes verwandt, herrlich!", and also printed on a label, which has been pasted to the rock: "Nymphes fossilis Hagen. Paleont. X. P. 108 No. 36. Type. Solenhofen, Dr. Krantz."

The generic affinities of *Mesonymphes* are quite obvious. From *Nymphites* it differs by the possession of an unbranched media in the fore wing, by a more pronounced development of the costal space towards the apex of the wing, by the more specialized termination of R1, and especially in the degree of development of Cu2. In the structure of the first three of these features the venation approaches that of *Nymphes* itself, but the cubitus is decidedly different. Cu1 of *Mesonymphes* sends off only seven branches while Cu2 gives rise to eleven; in *Nymphes* there are 8 branches leading from Cu1, and only 5 from Cu2. There is a close resemblance of *Mesonymphes* to the Myiodactylid genus *Osmylops*, which inhabits parts of Australia.<sup>1</sup> The costal area is much broader in the recent genus and the terminations of Sc and R1 are somewhat different, but the structure of the cubitus in the fore wing is quite the same in both genera. Martynov has described a related Neuropteran from the Jurassic beds of Turkestan (1927), but this fossil has closer affinities with the *Hemerobiidae* than with the *Nymphitidae*.

The modern aspect of *Mesonymphes* is of unusual interest. If a Neuropteran with the venational characteristics of *Mesonymphes* were found in the tropics at the present time, it would probably not arouse much comment. The only feature of this insect which is more primitive than that of *Nymphes* is the small number of cross-veins. For although Martynov in his description of the Turkestan form claims that the original ancestral condition of the Myrmeleontid types was characterized by a larger number of cross-veins, which have decreased from the Jurassic to the present, this conception is contrary to all the evidence that has been accumulated on the evolution of the order.

<sup>1</sup>I do not accept Tillyard's interpretation of the venation of this genus, as explained in his "Insects of Australia and New Zealand" (p. 321, and fig. U16). The vein which he has labeled M3+4, being strongly *convex*, is Cu1, and his Cu1, being strongly *concave*, is Cu2.

Tillyard, in his Panorpid Complex, concluded from a study of recent and fossil Neuroptera that the ancestral and primitive forms of the order possessed only a few, widely-spaced cross-veins, and nothing has subsequently been found to refute his view. This small number of cross-veins is the only characteristic of *Nesonymphe*s which is not found in *Nymphe*s or closely related genera now existing in the tropics.

#### *References*

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